

REMARKS/ARGUMENTS

This amendment is responsive to the Office Action mailed April 23, 2003 wherein claims 1-4, 8, 9 and 11-15 were rejected under 35 USC §102 (b) as being anticipated by Mistic (US 6,040,697); and claims 5-7 and 10 were rejected under USC §103 (a) on Mistic in view of Pauly et al. (US 4,985,677). Further in the Office Action, Figures 1-5 were objected to by the Draftsperson. In this amendment, the specification has been amended, claims 1, 7 and 8 have been amended, claims 5, 6 and 10 were cancelled and corrected drawings have been submitted. No new matter has been added.

Claims 1-4 and 7-9 and 11-15 remain pending in this application. Reconsideration in light of the above amendments and the following remarks is respectfully requested.

Figures 1-5 have been corrected to overcome the objections of the Draftsperson regarding copy machine marks. Figures 2 and 5 have been corrected to comply with scale and number/letter size requirements. Further, Figure 5 has been corrected to include figure legends in order for a more clear understanding of the invention and to Figure 5 has been corrected for typographical errors so that the figures 5A-5D were correctly referenced consistent with the specification. As corrected, Figures 5A and 5B have been changed to Figures 5B and 5C. Figure 5C has been changed to 5D and Figure 5D has been changed to 5A. No new matter was added and Applicant submits that the renumbered figures are now consistent with the specification as filed.

The specification has been amended to correct a typographical error and a rewritten paragraph is submitted herewith.

Independent claims 1 and 8 have been amended to more clearly recite Applicant's invention and to further distinguish Applicant's invention over the Mistic reference. Claims 1 and 8, as amended, now recite a RF coil array assembly and method for MRI in which the currents each are controlled by a RF pulse waveform designed along with gradient waveforms, the waveforms being designed to effect shorter time-span excitation k-space traversing by means of reducing excitation k-space sampling density, and wherein the controlled currents are for defining and steering an excitation volume of an examined subject within the MRI system. Support for the amendments can be found in claims 5, 6 and 10, which were originally filed and have been incorporated into claims 1 and 8.

The rejection of Claims 1-4, 8, 9 and 11-15 under 35 USC §102 (b) on the Mistic reference is respectfully traversed. The present invention as claimed in Claims 1 and 8, now amended, is

patentable over the Misic reference. "Anticipation requires the disclosure in a single prior art reference of each element of the claim under consideration." W.L. Gore & Associates v. Garlock, Inc., 220 USPQ 303, 313 (Fed. Cir. 1983). As is noted in the Office Action, nowhere does the Misic reference show, disclose or teach a) current control in each coil of a transmit coil array assembly by RF waveforms designed along with gradient waveforms; b) the waveforms being designed to effect short time-spin excitation k-space traversing by the means of reducing k-space sampling density; and c) the coils assembly design being based on computing wave forms based on the desired shape and location of an excitation volume and the profiles of the RF fields related to the component coils. Therefore, the present invention as claimed in amended claims 1 and 8 is not anticipated by the Misic reference. Withdrawal of the rejection of claims 1 and 8, and claims dependent therefrom, under 35 USC §102 is respectfully solicited.

The rejection of Claims 5-7 and 10 under 35 USC §103 (a) over the Misic reference in view of the Pauly reference is respectfully traversed. Although claims 5, 6 and 10 have been cancelled, the limitations of claims 5, 6 and 10 have been incorporated into amended claims 1 and 8 and therefore Applicant respectfully submits the following remarks with reference to now amended claims 1 and 8. As stated above, claims 1 and 8 now recite currents for defining and steering an excitation volume, where the currents are controlled by a RF pulse waveform designed along gradient waveforms and wherein the waveforms are designed to effect shorter time-span excitation k-space traversing by means of reducing excitation k-space sampling . As noted in the Office Action, the Misic reference does not show, disclose or teach a) current control in each coil of a transmit coil array assembly by RF waveforms designed along with gradient waveforms; b) the waveforms being designed to effect short time-spin excitation k-space traversing by the means of reducing k-space sampling density; and c) the coils assembly design being based on computing wave forms based on the desired shape and location of an excitation volume and the profiles of the RF fields related to the component coils. In the Office Action, the Examiner states that it would be obvious to one of ordinary skill in the art to combine the teachings of the Pauly reference related to the shape and design of the excitation waveform with the Misic reference to obtain Applicant's invention.

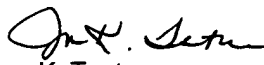
Applicant respectfully submits that the Pauly reference does not overcome the deficiencies of the Misic reference. For a *prima facie* case of obviousness, the Examiner must set forth the differences in the claim over the applied references, set forth the proposed modification of the references which would be necessary to arrive at the claimed subject matter, and explain why the proposed modification would be obvious. Applicant interprets the Office Action as stating the proposed modification is to combine the teachings of Pauly et al. related to the shape and design of the excitation waveform with the RF coil assembly and method of Misic. The Office

Action suggest the motivation for this modification would be to improve image quality by decreasing artifacts and also reducing imaging time. Applicant respectfully submits neither the Misic nor the Pauly reference teach, disclose or suggest defining and steering an excitation volume within an examined subject using waveforms designed to effect shorter time-span excitation k-space traversing by reduced k-space sampling density. Pauly et al. merely discloses a method for MRI using phased arrays and reducing k-space sampling to reduce imaging time and artifacts caused by full sampling. Nowhere does Pauly et al. show, teach or suggest a defining or steering an excitation volume within the examined subject as claimed by Applicant in claims 1 and 8. By contrast, the Pauly method images the entire volume defined by the phased arrays or coil array system selected for the anatomical region of interest, for example a knee, foot, ankle, wrist or hand. Nowhere does Pauly reference discuss or suggest recognition of the problems associated with or advantages of defining and steering an excitation volume while imaging using a RF coil array. Therefore, since there is no teaching of the particular problems relating to defining/steering excitation volumes in either of the applied references, Applicant respectfully submits that there is no reasonable motivation for combining the Misic and Pauly references, other than hindsight. Thus, Applicant respectfully solicits withdrawal of the rejections under 35 USC §103 (a).

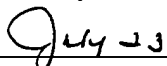
In view of the foregoing amendment and for the reasons set out above, Applicants respectfully submit that the application is in condition for allowance. Favorable reconsideration and prompt allowance of the application are respectfully requested.

Should the Examiner believe that anything further is needed to place the application in condition for allowance, the Examiner is requested to contact Applicants' undersigned representative at the telephone number below.

Respectfully submitted,


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